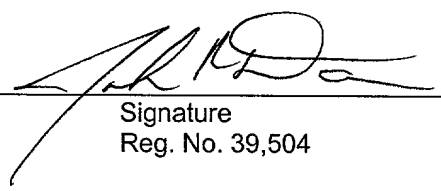


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<b>UTILITY PATENT APPLICATION TRANSMITTAL</b>  (NONPROVISIONAL APPLICATIONS)	Attorney Docket No.: 1244-003	Total Pages: 39
	First Named Inventor: Anthony G. Ingram et al.	
	Title: TRAVEL TRAILER	
	Express Mail Label No. EL404591644US	
<b>APPLICATION ELEMENTS</b> (REF. MPEP 600)	<b>ADDRESS</b> TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231	
1. <input checked="" type="checkbox"/> Fee Transmittal Form (Orig. & Duplicate)	6. <input type="checkbox"/> Microfiche Computer Program (Appendix)	
2. <input checked="" type="checkbox"/> Specification Total Pages: 25 <ul style="list-style-type: none"><li>- Descriptive Title of the Invention</li><li>- Cross Reference to Related Applications</li><li>- Statement Re. Fed Sponsored R&amp;D</li><li>- Reference to Microfiche Appendix</li><li>- Background of the Invention</li><li>- Brief Summary of the Invention</li><li>- Brief Description of the Drawings (if filed)</li><li>- Detailed Description</li><li>- Claim(s)</li><li>- Abstract of the Disclosure</li></ul>	7. <input type="checkbox"/> Nucleotide or Amino Acid Seq. Submission <ul style="list-style-type: none"><li>a. <input type="checkbox"/> Computer Readable Copy</li><li>b. <input type="checkbox"/> Paper Copy</li><li>c. <input type="checkbox"/> Statement Verifying Identity of copies</li></ul>	
3. <input checked="" type="checkbox"/> Drawing(s) (35USC113) Total Sheets: 5	<b>ACCOMPANYING APPLICATION PARTS</b>	
4. <input checked="" type="checkbox"/> Oath or Declaration Total Sheets: 2 <ul style="list-style-type: none"><li>a. <input checked="" type="checkbox"/> Newly executed (original or copy)</li><li>b. <input type="checkbox"/> Copy from prior appl. (37CFR1.63(d))<ul style="list-style-type: none"><li>i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in prior application, see 37 CFR 1.63(d) and 1.33(b).</li></ul></li></ul>	8. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & documents)	
5. <input type="checkbox"/> Incorporation by Reference (if box 4b is checked) The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.	9. <input type="checkbox"/> 37 CFR 3.73(b) Statement (when assigned) <input type="checkbox"/> Power of Attorney	
	10. <input type="checkbox"/> English Translation Document	
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	12. <input type="checkbox"/> Preliminary Amendment	
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	15. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority claimed)	
	16. <input type="checkbox"/> Other:	
17. If a CONTINUING APPLICATION, <input type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-in-Part of prior application no. /		
<b>18. CORRESPONDENCE ADDRESS</b>		
Customer Number: 21034  John R. Dawson ipsolon llp 4370 NE Halsey Street Portland, OR 97213  Telephone: (503) 249-7066 Facsimile: (503) 249-7068		 Signature Reg. No. 39,504  Date: August 1, 2000

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08/01/00

**STATEMENT CLAIMING SMALL ENTITY STATUS**  
**(37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR**

**Docket Number**  
**1244-003**

Applicant, Patentee, or Identifier: Anthony G. Ingram, Marion B. Johnson, Terry L. Harkins

Application or Patent No.:

Filed or issued: Herewith

Title: TRAVEL TRAILER

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☒ the specification filed herewith with title as listed above  
☐ the application identified above.  
☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☐ No such person, concern, or organization exists.  
☒ Each such person, concern, or organization is listed below.

B & B Homes Corp.  
P.O. Box 2349  
Mills, Wyoming 82644

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Anthony G. Ingram  
NAME OF INVENTOR

  
Signature of inventor

8-1-00  
Date

Marion B. Johnson  
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8-1-00  
Date

Attorney Ref. No. 1244-003

Applicant, Patentee, or Identifier: Anthony G. Ingram, et al.  
Application or Patent No.:  
Filed or Issued: herewith  
Title: TRAVEL TRAILER

**STATEMENT CLAIMING SMALL ENTITY STATUS  
(37 CFR 1.9(f) and 1.27(c)) -- SMALL BUSINESS CONCERN**

I hereby declare that I am

- ☒ the owner of the small business concern identified below:  
☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN B & B Homes Corp.  
ADDRESS OF SMALL BUSINESS CONCERN P.O. Box 2349  
Mills, WY 82644

I hereby state that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office. Questions related to size standards for a small business concern may be directed to: Small Business Administration, Size Standards Staff, 409 Third Street SW, Washington, DC 20416.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- ☒ the specification filed herewith with title as listed above.  
☐ the application identified above.  
☐ the patent identified above.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate statements as to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each such person, concern, or organization having any rights in the invention is listed below:

- ☒ no such person, concern, or organization exists.  
☐ each such person, concern, or organization is listed below:

FULL NAME:

ADDRESS:

- ☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

Separate statements are required from each named person, concern or organization having rights to the invention stating their status as small entities (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

NAME OF PERSON SIGNING: Anthony G. Ingram  
TITLE OF PERSON OTHER THAN OWNER: Owner  
ADDRESS OF PERSON SIGNING: 1641 Goodstein Drive, Casper, WY 82601

SIGNATURE



DATE

8-1-00

## **TRAVEL TRAILER**

### **TECHNICAL FIELD**

The invention is an improved travel trailer. In particular, the invention concerns a travel trailer having an improved chassis that is strong, easy, and economical to manufacture, and has at least one floor suspended from the chassis, which preferably optimizes use of available storage space beneath that floor.

### **BACKGROUND OF THE INVENTION**

Travel trailers, which are towed vehicles usually having many of the  
10 conveniences of a home, are widely known and popular. One known type of travel trailer is commonly referred to as a "fifth-wheel" trailer, which is particularly adapted to be towed by a traditional pick-up truck. Namely, the forward portion of the fifth-wheel trailer is elevated above the bed of the pick-up truck and includes a mounting portion extending from the bottom of the elevated forward portion to a trailer mount, or hitch, secured to the bed of the pick-up truck.

Because of height restrictions imposed on travel trailers operating on most highways and aerodynamic considerations associated with towing a travel trailer at high speeds, the total desirable height above the ground for a fifth-wheel trailer is limited. Accordingly, the elevated forward portion typically has limited headroom,  
20 and therefore is usually used as a bedroom. The remaining aft portion of the fifth-wheel trailer typically includes a bathroom portion and general living portion.

Plumbing in trailer bathrooms typically includes gray and black water storage

tanks and related tubing and valves extending from one or more toilets, shower drains, sink drains, and the like within the bathroom, to these storage tanks. To take full advantage of gravity, these types of storage tanks are typically mounted somewhere below the drains and toilet such that water from these devices flows freely through this tubing to its respective storage tanks. Accordingly, it is desirable to elevate the floor of the bathroom portion of a trailer above the bottom of the trailer.

Because of the limited headroom, it is not desirable to elevate the bathroom portion of the floor to the height of the forward bedroom floor of the trailer.

Accordingly, the typical fifth-wheel trailer will usually longitudinally position the  
10 bathroom portion between the bedroom and living portion, and vertically elevate the floor of the bathroom portion to an intermediate height between the heights of the bedroom and living portion floors. The end result is a fifth-wheel trailer having three floor heights above the ground. A first height toward the aft of the trailer supporting the living portion, a second height toward the center of the trailer supporting the bathroom portion, and a third height toward the front of the trailer supporting a bedroom.

The area below the second height and the bottom of the trailer is typically enclosed and used as a storage space for the storage tanks, valves, and plumbing. In addition, this area is typically large enough to be used as a general storage area, or  
20 trunk space, for gear and the like. Accordingly, one or more access doors may be provided along the exterior walls of this storage area to provide access to this space. It

is desirable for this storage area to be large and easily accessible.

The chassis of a typical fifth-wheel trailer must be sufficiently strong to support the trailer, and durable enough to resist weakening over a lifetime of prolonged use. Since the typical fifth-wheel trailer is regularly towed at high speeds and over rough or unimproved roads, the chassis must also withstand a tremendous amount of dynamic loads placed on it. Typical chassis materials are incredibly strong and durable. For example, a typical fifth-wheel chassis will be made of welded-together portions of elongate steel I-beam having an eight-inch to 12-inch vertical web. In general, the fewer parts and welds making up the primary load carrying chassis structure, the stronger and more durable the chassis.

A particularly strong chassis design is commonly known as a two level chassis. It's general design is shown and identified as prior art in Figure 1A of U.S. Pat. No. 5,746,473 to Crean, the disclosure of which is hereby incorporated by reference. A two level chassis features an elongate horizontal lower beam (114, Fig. 1A of Crean), an elevated elongate horizontal upper beam (116, Fig 1A of Crean), and an interconnecting vertical section (115, Fig. 1A of Crean) joined to both the lower and upper beams as shown in figure 1A of Crean, usually by welding. The elevated bathroom portion (122, Fig. 1A of Crean) of the typical two level chassis is typically a platform structure constructed of elongate wood members, metal members, or the like, and is supported above and by the lower beam (114, Fig. 1A of Crean). A storage space (140, Fig. 1A of Crean) is defined as the area below the elevated bathroom floor,

but above the lower beam.

While the typical two level chassis is particular strong, the design also limits the amount of available storage in the storage area and access to that storage area. In particular, since the lower beam defines the lower portion of the storage area, the total volume of the storage area is narrowed by the vertical width of the webbing on that beam. For example, using typical chassis materials having an eight-inch to twelve-inch vertical web, the height of the storage area would be reduced by eight to twelve inches, thereby reducing the total volume of the storage area.

In practice, the height limitations imposed by positioning the chassis beam in  
10 this area prevents common oversized travel trailer-related items, such as traditional elongate, cylindrical 40 pound Liquid Petroleum Gas ("LPG") tanks, from being accommodated easily in the storage area. In particular, in order for these types of items to fit within such known storage areas, they must either 1) be stored on their sides, thereby taking up much desirable floor space in the storage area, or 2) in some models be stored upright within a limited outrigger area between the chassis beam and storage area door, thereby blocking access to the majority of the storage area.

Some inventors have attempted to improve access to and the overall amount of storage space available in the storage area of a traditional fifth-wheel trailer. However, such improvements typically compromise chassis integrity and significantly increase  
20 chassis construction costs. For example, U.S. Patent No. 5,746,473 to Crean teaches using a three-level chassis structure, which is also commonly referred to as a three-step

chassis. Figure 2A of Crean shows the general layout of such a three level chassis. Basically, the bottom level, or step, is a horizontal elongate lower chassis beam (202, Fig. 2A of Crean) that supports the aft living portion of the fifth wheel trailer. The forward bedroom is supported by a horizontal elongate upper chassis beam (210, Fig. 2A of Crean), and the bathroom portion is supported by a horizontal elongate intermediate chassis beam (208, Fig. 2A of Crean). The forward end of the lower chassis beam is joined to the back end of the intermediate chassis beam at an aft vertical section, and the forward end of the intermediate chassis beam is joined to the back end of the upper chassis beam at a forward vertical section. Accordingly, the chassis structure forms three steps from the lower chassis beam to the intermediate chassis beam and then the upper chassis beam.

As a result, the thick lower beam does not block the lower entrance to the storage area, thereby, Crean suggests, the storage area is more easily accessible. Crean also teaches mounting the black and gray water tanks to the intermediate chassis beam, thereby elevating them within the storage area. Accordingly, Crean reports that heavy objects need not be lifted as high to place them in the storage area.

While the three-level chassis in Crean offers these limited benefits, the design essentially doubles the number of parts and welds comprising the load carrying chassis components over a traditional two-level chassis. Accordingly, a three-level chassis is more costly to manufacturer and less durable than a similarly sized two-level chassis structure. Moreover, because the upper edge of the storage area is defined by the



intermediate beam, and the thickness of the intermediate beam is essentially as thick as a traditional lower beam on a two-level chassis, the height of the storage area, and accordingly its volume, is still limited by the chassis structure. For example, where the intermediate beam is made of typical chassis materials having an eight-inch vertical web, the height of the storage area would be reduced by eight inches, thereby reducing the total volume of the storage area. Accordingly, as with a traditional two-level chassis, the height limitations imposed by positioning the intermediate chassis beam in this area still prevents common oversized travel trailer-related items, such as 40 pound LPG tanks, from being accommodated easily in the storage area. Moreover, positioning the black and gray storage tanks adjacent to the intermediate beams, as taught by Crean, further reduces the height of the storage area, thereby further compromising the storage area's ability to accommodate common large objects. Because the intermediate chassis beam is a primary load carrying chassis element, any reduction in the thickness of this beam around the storage area of a three-level chassis to increase the height of the storage area would compromise the strength of the chassis.

Accordingly, despite the known improvements to fifth-wheel travel trailer chassis designs, there remains a need for a chassis that has the strength, durability, and economy of a traditional two-level chassis, but also optimizes the height of the storage area beneath the bathroom portion to easily accommodate common large objects used with travel trailers. In addition to other benefits that will become apparent in the

following disclosure, the present invention fulfills these needs.

### SUMMARY OF THE INVENTION

The present invention is a travel trailer having a two-level chassis supporting at least three discrete floor sections at three different heights above the ground. In particular, an aft floor section is positioned at a lower height, a fore floor section is positioned at an upper height, and an intermediate section is positioned at a height intermediate to the lower and upper heights. The area underneath the intermediate section and above the bottom of the trailer, defines a storage area.

10 The two-level chassis includes generally horizontal upper and lower chassis beams. The aft floor section is supported by the lower chassis beam, and the fore floor section is supported by the upper beam. The intermediate section is suspended from the upper chassis beams such that the height of, and general access to, the storage area is optimized because the chassis beams do not interfere with access to this area.

In a preferred embodiment, common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within a limited section of the storage area, such as near the rear of the storage area, whereby the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized  
20 objects.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a side elevation view of a travel trailer in accordance with a preferred embodiment of the invention.

FIG. 2 is an isometric view of the chassis structure of the travel trailer of FIG. 1.

FIG. 3 is an isometric view of the chassis structure of FIG. 2 having floor portions mounted thereto with at least one floor portion suspended from the chassis in accordance with a preferred embodiment of the present invention.

FIG. 4 is a fragmentary side view taken along line 4-4 of FIG. 3..

10 FIG. 5 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail.

FIG 6 is a cross-sectional view taken along lines 6-6 of FIG. 2.

FIG. 7 is a fragmentary isometric view of the chassis structure and floor portions mounted thereto of FIG. 3 with some elements removed to show underlying detail and a possible orientation of common trailer accessories in accordance with a preferred embodiment of the present invention.

## DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

An improved travel trailer 10 having an enclosed shelter 12 supported by a two-level chassis 14 defining a forward upper portion 16 and a rearward lower portion 18, wherein the chassis 14 supports at least three discrete floor sections 20a, 20b, 20c by suspending at least one floor section 20b from the forward upper portion 16 is disclosed in figures 1-7.

### A. Chassis Assembly

As best shown in figure 2, the chassis 14 preferably includes a left and right chassis beam assembly 22a, 22b respectively, with each beam assembly 22a, 22b including an elongate lower chassis beam 24a, 24b and an elongate upper chassis beam 26a, 26b joined together at vertical riser assemblies 28a, 28b. Each upper chassis beam 26a, 26b and lower chassis beam 24a, 24b has a front end 30 and a back end 32, with the front end 30 of the lower chassis beams 24a, 24b secured to the back ends 32 of their respective upper chassis beams 26a, 26b at the vertical riser assemblies 28a, 28b such that the upper chassis beams 26a, 26b and lower chassis beams 24a, 24b are aligned parallel with each other and the upper chassis beams 26a, 26b are horizontally-aligned above the lower chassis beams 24a, 24b as shown.

The left and right beam assemblies 22a, 22b are spaced apart from each other and joined together with a plurality of chassis cross-members 40a-i positioned along the longitudinal length of the chassis 14, such that the lower chassis beams 24a, 24b

and cross members 40c-i define the rearward lower portion 18 of the chassis 14 and the upper chassis beams 26a, 26b and cross-members 40a, 40b define the forward upper portion 16 of the chassis.

Preferably, the upper and lower chassis beams 26a, 26b, 24a, 24b are constructed with strong and durable materials, such as steel I-beams. More preferably, the lower chassis beams 24a, 24b have a 12-inch vertical web 41a, and the upper beams have an 8-inch vertical web 41b.

The rearward lower portion 18 of the chassis 14 includes at least one perpendicularly aligned wheel assembly 42a, 42b, 42c, preferably including an axle tube 44a, 44b, 44c secured to the lower side 46 of the lower chassis beams 24a, 24b at suspension elements (not shown). An axle hub (not shown) is journaled to each axle tube 44a, 44b, 44c and secured to wheels 50a, 50b, 50c, preferably having tires 52a, 52b, 52c attached to them and aligned substantially parallel to the lower chassis beams 24a, 24b.

The underside 54 of the forward upper portion 16 of the chassis includes a mounting portion 56 for detachable securing the chassis 14 to a trailer mount (not shown), or hitch. Preferably, a pair of jack legs 58a, 58b, each having a support tube 59a, 59b and a retractable extension portion 60a, 60b, is secured to the underside 54 of the forward upper portion 16 as shown to support the forward upper portion 16 when the trailer 10 is detached from its towing vehicle (not shown). More preferably, the support tubes 59a, 59b are steel 4-inch by 2-inch tubes having a thickness of 3/16 of an

inch and include jack leg reinforcement members 62a, 62b having slightly angled front ends 64a, 64b and gussets 66a, 66b as best shown in figures 2 & 4.

The vertical riser assemblies 28a, 28b each preferably include a generally vertically aligned perimeter chassis post 68a, 68b and an inner chassis post 70a, 70b joined together by transition members 72a-f. As best shown in figure 2, the front ends 30 of the lower chassis beams 24a, 24b are secured to the lower ends of the inner chassis posts 70a, 70b, and the back ends 32 of the upper chassis beams 26a, 26b are secured to the upper ends of the perimeter chassis posts 68a, 68b preferably by welding. More preferably, the chassis posts 68a, 68b, 70a, 70b are constructed of  
10 elongate steel tube, such as 5-inch by 3-inch tube having a thickness of 3/16 of an inch. Each riser assembly 28a, 28b preferably includes reinforcing gussets 74a, 74b, 75a, 75b, and the upper and lower transition members 72a, 72c, 72d, 72f are angled as shown with respect to the chassis posts 68a, 68b, 70a, 70b to increase the strength and durability of the joints.

As best shown in figure 2, cross-members 40c-h in the rearward lower portion  
18 of the chassis 14 each include upper and lower members 82, 84 secured together by extension members 86, which are preferably angled. More preferably, cross-member 40i is positioned at the back ends 32 of the lower chassis beams 24a, 24b and is a Z-beam having a vertical web.

20 Cross-members 40a, 40b in the forward upper portion 16 of the chassis 14 are preferably elongate steel 8-inch by 2-inch tubes having a 3/16-inch thickness with one

cross-member 40a positioned at the front ends 30 of the upper chassis beam 26a, 26b. More preferably, supports 90 extend between cross members 40a, 40b as shown in figure 2.

An elongate chassis rail lateral tie 92 is secured to and suspended below the upper chassis beams 26a, 26b. Preferably, the lateral tie 92 has a generally Z-shaped cross-section, forming an upper lip 94 and a lower lip 96 separated by an angled web 98, with the upper lip 94 extending toward the front of the chassis 14 and the lower lip 96 extending toward the back of the chassis 14. More preferably, the ends of the lateral tie 92 are secured to the angled ends 64a, 64b of the jack-leg reinforcement members 62a, 62b as best shown in figures 4 & 7.

B. Suspended Floor Assembly And Storage Area Details

As best shown in figures 3 & 4, a lower floor 20c is supported by the lower portion 18 of the chassis 14, preferably by extending spaced apart elongate lower floor joists 100 from the lower ends of the vertical riser assemblies 28a, 28b to the back ends 32 of the lower chassis beams 24a, 24b and securing planar floor members 102 thereon. Similarly, the upper floor 20a is supported by the upper portion 16 of the chassis 14, preferably by extending spaced apart elongate upper floor joists 104 from an area generally near the front of the chassis 14 to the upper lip 94 of the chassis rail lateral tie 92 and securing planar floor members 102 thereon.

The intermediate floor 20b is suspended below the upper portion 16 of the chassis in an area between the upper floor 20a and lower floor 20c. Preferably, the

upper floor 20a defines a bedroom, the lower floor 20c defines a living area, and the intermediate floor 20b defines a bathroom section of the trailer 10.

One known apparatus for suspending the intermediate floor 20b includes extending an elongate generally horizontal aft intermediate floor support 106 between the vertical chassis riser posts 68a, 68b at a height generally horizontally-aligned with the lower lip 96 of the chassis rail lateral tie 92. In an area that is preferably equal distance between the lateral tie 92 and the aft intermediate floor support 106, a suspended girder 108 having an upper edge 110 is suspended from the upper chassis beams 26a, 26b such that the upper edge 110 is on the same horizontal plane as the lower lip 96 of the lateral tie 92, preferably by extending suspension elements 112a, 112b from the upper chassis beams 26a, 26b and securing the girder 108 to the suspension elements 112a, 112b. Spaced apart intermediate floor joists 120 extend from the lower lip 96 of the lateral tie 92 to the aft intermediate floor support 106. The intermediate floor joists 120 are also supported at the upper edge 110 of the suspended girder 108 as shown. Planar floor members 102 are secured to the intermediate floor joists 120 thereby defining the intermediate floor 20b at a height between the upper and lower floors 20a, 20c, respectively. Preferably, a step 124 is provided between the lower floor 20c and intermediate floor 20b to facilitate access between these floors.

The area between the support tubes 59a, 59b and vertical riser assemblies 28a, 28b, above the bottom of the trailer 46, and below the intermediate floor joists 120



defines a storage area 126, or trunk space, of the trailer 10. The intermediate floor 20b is suspended from the upper chassis beams 26a, 26b such that the height 127 of, and general access to, the storage area 126 is optimized because the chassis beams 24a, 24b, 26a, 26b do not interfere with access to this area.

Preferably, the floor 128 of the storage area 126 is supported by a storage area lateral tie 130 extending between the lower end portions of the support tubes 59a, 59b and spaced apart elongate extension members 132 extending from the storage area lateral tie 130 to the lower chassis beam 24a, 24b as best shown in figure 5. Spaced apart storage area floor joists 134, extending between the sides of the storage area 126, are secured the elongate extension members 132. Planar floor members 102 are secured to the storage area floor joists 134, defining the floor 128 of the storage area 126. Accordingly, the distance between the floor 128 of the storage area 126 and the lower edge of the intermediate floor joists 120 defines the height of the storage area.

The upper floor joists 104, lower floor joists 100, and intermediate floor joists 120, storage area lateral tie 130, and elongate extension members 132 do not carry the a great of a load as that carried by the chassis 14. Accordingly, these components need not be as strong as the chassis components, and accordingly can have smaller cross-sectional dimensions. For example, the upper, lower, and intermediate floor joists 104, 100, 120, respectively, are preferably constructed with 1-inch by 1-inch 11 gage steel tubes, and the storage area lateral tie 130 and elongate extension members 132 are preferably constructed with 2-inch by 2-inch steel tubes having a  $\frac{1}{4}$  -inch

thickness. Of course these components can be made with any other suitably sized, shaped, and strong materials, including wood, other metals, and synthetic or composite materials.

As best shown in figure 1, the enclosed shelter 12 encloses the storage area and includes a plurality of access doors 136. Preferably, the access doors 136a-c open outward and the height of the access doors 136 is substantially equivalent to the height of the storage area 126, thereby not becoming a limiting factor in the size of objects that may be placed in the storage area 126.

More preferably, and as best shown in figures 4 and 7, a planar sliding mechanism 138 having a pair of rail sliders 140 secured to the storage area floor 128, and a platform 142 sized to support a conventional 40 pound LPG removable bottle 144 is slidably secured to the rail sliders 140. An appropriately sized access door 136a is aligned with the sliding mechanism to permit easy access.

#### C. Plumbing and Related Hardware Details

Optimal storage space is provided by clustering the common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like within the same area in or near the storage area. As best shown in figure 4 & 7, an elongate black water tank 150 having a substantially rectangular cross-section preferably rests on the storage area floor 128 in the back of the storage area 126 with a drain 152 extending upward from the black tank 150 through the bathroom intermediate floor 20b. A remotely-actuated valve, such as a cable actuated black

water tank dump valve 154 is positioned adjacent to and in fluid communication with the black water tank 150, and associated plumbing (not shown) is preferably installed to the valve 154 to accommodate easy emptying of the tank 150.

An elongate gray water tank 156 having a substantially rectangular cross section is preferably secured within an area below the lower floor joists 100, above the bottom of the trailer 46, and between the lower chassis beams 24a, 24b and lower cross-members 40c, 40d. A remotely-actuated valve, such as a cable actuated gray water tank dump valve 158 is positioned adjacent to and in fluid communication with the gray water tank 156 and associated plumbing (not shown) is preferably installed to  
10 accommodate easy emptying of the gray water tank 156. Preferably the cable actuation control handles 160a, 160b for the black and gray water dump valves 154, 158 are positioned together, adjacent to the outside of the trailer, and outside of the storage area for easy actuation, even if the storage area 126 is full.

If desired, a traditional trailer furnace (162, figure 4) may be secured to the intermediate floor joists 120 near the black water tank 150.

#### D. Use and Operation

The travel trailer 10 accordingly to the present invention is used like any other fifth-wheel trailer. Appropriate home furnishings and conveniences are placed in the living, bathroom, and bedroom portions of the trailer, which has the strength and  
20 durability of any trailer having a conventional two-level chassis.

However, volume of the storage area 126, and access to that area, is optimized. For example, thick chassis beams do not limit the height of the storage area, or require a user to lift items to be stored above any bottom chassis beam.

Moreover, by clustering the common fixed trailer accessories within the same area in or near the storage area, the remaining useful area within the storage area is optimized.

Accordingly, oversized objects can be easily accommodated in the storage area with minimal lifting. For example, a conventional 40 pound LPB removable bottle 144 typically is an elongate canister of about 29 ¼ inches having a flat bottom end 164 on which it rests, defining its standing position. The height 127 of the storage area can be  
10 high enough to easily accommodate this type of bottle in its standing position.

Moreover, in trailers so equipped, the sliding platform 142 and special access door 136a further facilitate loading and storage of these types of bottles.

In view of the wide variety of embodiments to which the principles of the invention can be applied, it should be apparent that the detailed description of a preferred embodiment is illustrative only and should not be taken as limiting the scope of the invention. For example, although the preferred chassis beams 24a, 24b, 26a, 26b are I-beams, any suitably strong shape or material could be used without departing from the scope of the invention. Moreover, although preferred sizes and materials for the various beams, tubes, posts and the like have been disclosed, any suitably strong  
20 materials, shapes, and dimensions may be used depending on the specific design needs of a particular trailer. Also, although three wheel assemblies 42a, 42b, 42c are shown

in the figures, one, two, or even more such assemblies could be used depending on the load to be incurred by the chassis. Accordingly, the claimed invention includes all such modifications as may come within the scope of the following claims and equivalents thereto.

## CLAIMS

### WHAT IS CLAIMED IS:

1. A travel trailer for being towed by a vehicle including:
  - a chassis having front and back ends and at least one elongate beam;
  - a wheel assembly secured toward the back end of the chassis;
  - a mounting portion secured toward the front end of the chassis for detachably securing said chassis to the vehicle;
  - a shelter secured to the chassis; and
  - a generally horizontal floor suspended from and positioned below the at least
- 10 one beam.
2. The travel trailer of claim 1, wherein said chassis is a two-level chassis having an upper portion and a lower portion, and said front end is at said upper portion and said back end is at said lower portion.
3. The travel trailer of claim 2, wherein said at least one beam includes said support portion of said chassis, and said floor is suspended from said upper portion of said chassis.

4. The travel trailer of claim 2, wherein the trailer has a lower edge, and further including an enclosed storage area below the suspended floor and above the lower edge of the trailer.

5. The travel trailer of claim 2, further including a generally horizontal upper floor positioned vertically above said generally horizontal floor, and a generally horizontal lower floor positioned vertically below said generally horizontal floor.

6. The travel trailer of claim 5, wherein said upper floor is secured to said upper portion of said chassis and said lower floor is secured to said lower portion of said chassis.

7. The travel trailer of claim 6, wherein:  
said trailer has a lower edge;  
said chassis includes an upper chassis beam secured to a lower chassis beam at a vertical riser;

said horizontal floor is suspended from said upper chassis beam; and further including an enclosed storage area below the horizontal floor, forward of the vertical riser and above the bottom edge of the trailer.

8. The travel trailer of claim 7, wherein said storage area has a storage area floor and further including:

a first liquid storage tank secured to the storage area floor adjacent to the vertical riser;

plumbing extending from the liquid storage tank to said floor;

a remotely-actuated dump valve having an actuation handle, said valve in fluid communication with said tank; and

said actuation handle secured outside of said storage area to facilitate easy actuation of the valve when the storage area is full.

10

9. The travel trailer of claim 8, wherein said lower beam has a vertical thickness and further including:

a second liquid storage tank secured below the lower floor, above the lower edge of the trailer, and within the area occupied by the vertical thickness of the lower beam;

a second remotely-actuated dump valve having a second actuation handle, said valve in fluid communication with said second tank; and

said second actuation handle secured outside of said storage area to facility easy actuation of said second valve when the storage area is full.

20



10. The travel trailer of claim 9, wherein said upper floor defines a bedroom area of the trailer, said floor defines a bathroom area of the trailer, and said lower floor defines a living area of the trailer.

11. The travel trailer of claim 9, further including a heater secured adjacent to said floor within and toward the rear of the storage area.

12. A two-level chassis for use on a fifth-wheel travel trailer having three floor areas supported at three different heights above the ground defining upper,

10 intermediate, and lower floors, said chassis including:

a pair of parallel aligned spaced apart substantially horizontal lower chassis beams;

a pair of parallel aligned spaced apart substantially horizontal upper chassis beams;

a pair of vertical riser assemblies, each riser assembly securing one upper chassis beam to one lower chassis beam such that said upper beam is vertically above and parallelly-aligned with said lower beam;

the upper floor secured to said upper beam;

the lower floor secured to said lower beam;

20 the intermediate floor suspended from said upper beam to a vertical height intermediate to the heights above the ground of the upper and lower floors.

13. The two-level chassis of claim 12, wherein the lower beam has a lower edge that defines the bottom of the chassis, and the area below the intermediate floor, forward of the vertical riser assemblies and above the bottom of the chassis is enclosed and defines a storage area having a storage area floor.

14. The two-level chassis of claim 13, wherein the storage area has a height, and said height is high enough to accommodate at least one conventional 40 pound LPG removable bottle in its standing position within the storage area.

10

15. The two-level chassis of claim 14, further including a sliding planar member secured to the storage area floor for easily loading and unloading said 40 pound LPG removable bottles within said storage area.

16. The two-level chassis of claim 12, wherein said upper and lower chassis beams are steel I-beams.

17. The two-level chassis of claim 16, wherein the intermediate floor is suspended from said upper beam by at least one Z-shaped lateral tie extending between  
20 said upper chassis beams.

18. The two-level chassis of claim 17, wherein said riser assemblies each include:

an inner vertical chassis riser post having a lower end with one of said lower chassis beams secured at said lower end;

a vertical perimeter chassis post having an upper end with one of said upper chassis beams secured at said upper end; and,

said inner vertical chassis riser post and said vertical perimeter chassis post secured together a plurality of transition members.

**TRAVEL TRAILER****ABSTRACT OF THE INVENTION**

A travel trailer having a two-level chassis supporting at least three discrete floor sections at three different heights above the ground with at least one of those floors being suspended from the chassis. In a preferred embodiment, the chassis has a substantially horizontal forward upper portion and a substantially horizontal rearward lower portion, and an upper floor is secured to the upper portion and a lower floor is secured to the lower portion with an intermediate floor suspended from the upper portion of the chassis to a height intermediate that of the upper and lower floors. The area underneath the intermediate section and above the bottom of the trailer defines a storage area that is not blocked or limited in size by the width of the chassis beams. In a more preferred embodiment, common fixed trailer accessories, such as gray and black water tanks, their related plumbing, trailer heaters and the like are clustered together within and near a limited section of the storage area, such as near the rear of the storage area, such that the majority of the storage area remains unoccupied. Accordingly, storage space within the storage area is optimized, and the full height of the storage area is available throughout the majority of the storage area to accommodate oversized objects.

10

Fig. 1

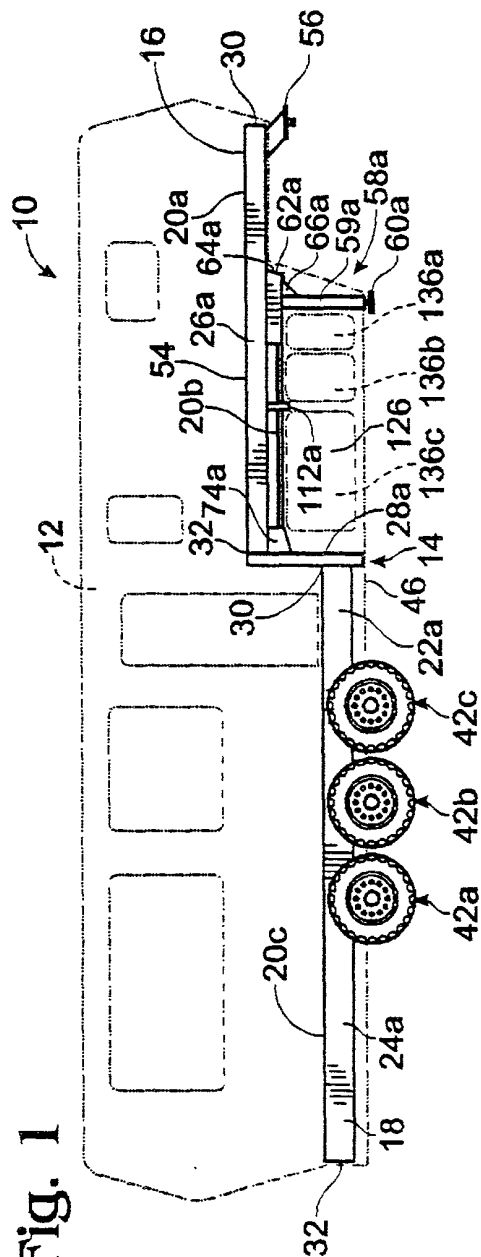


Fig. 4

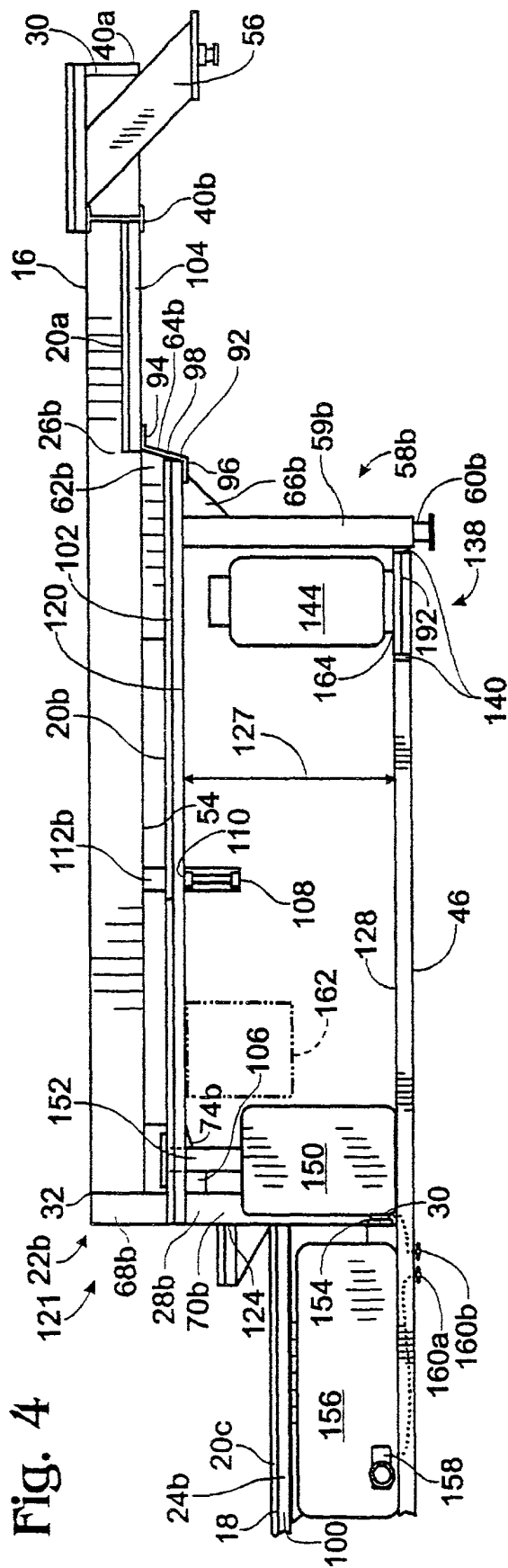
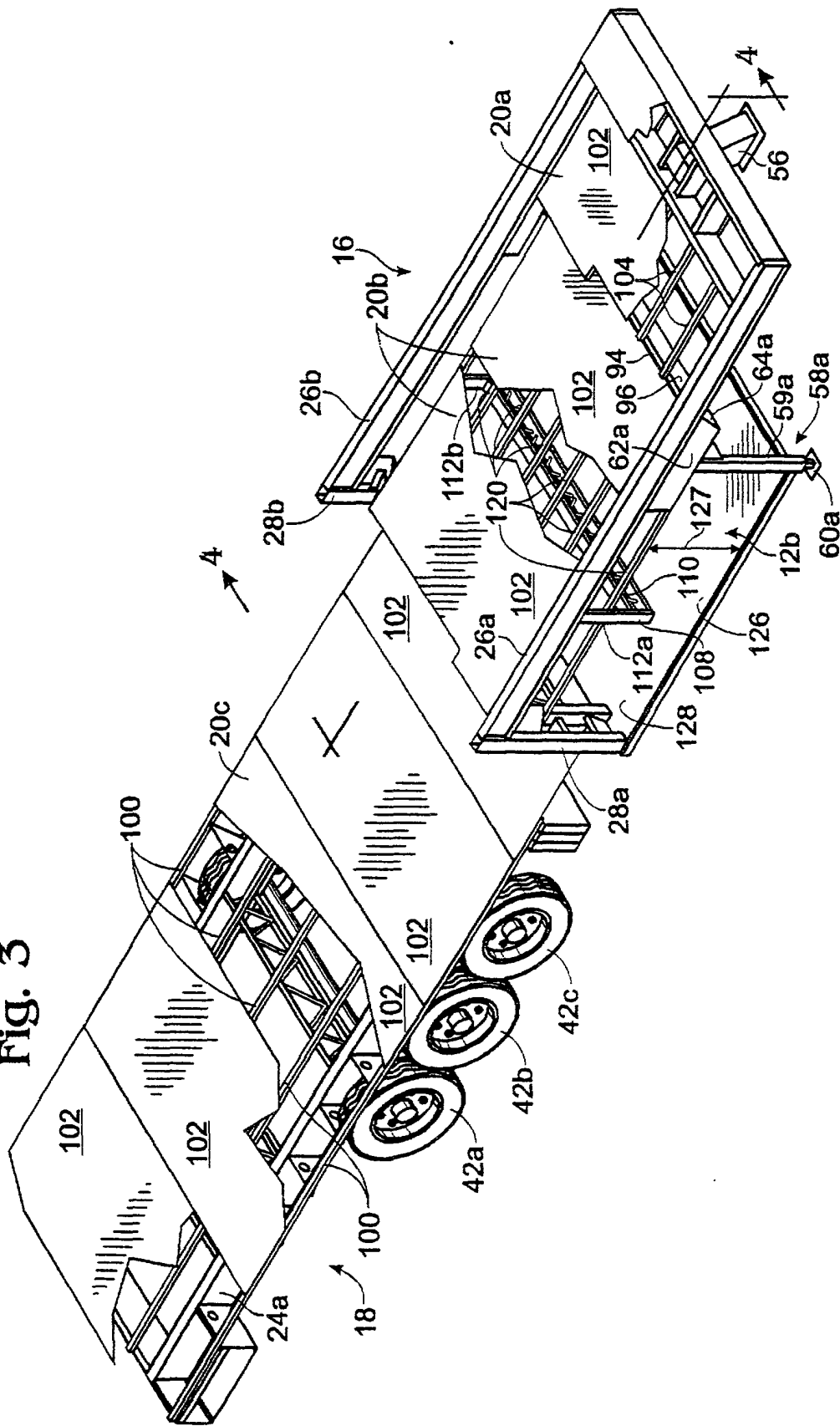
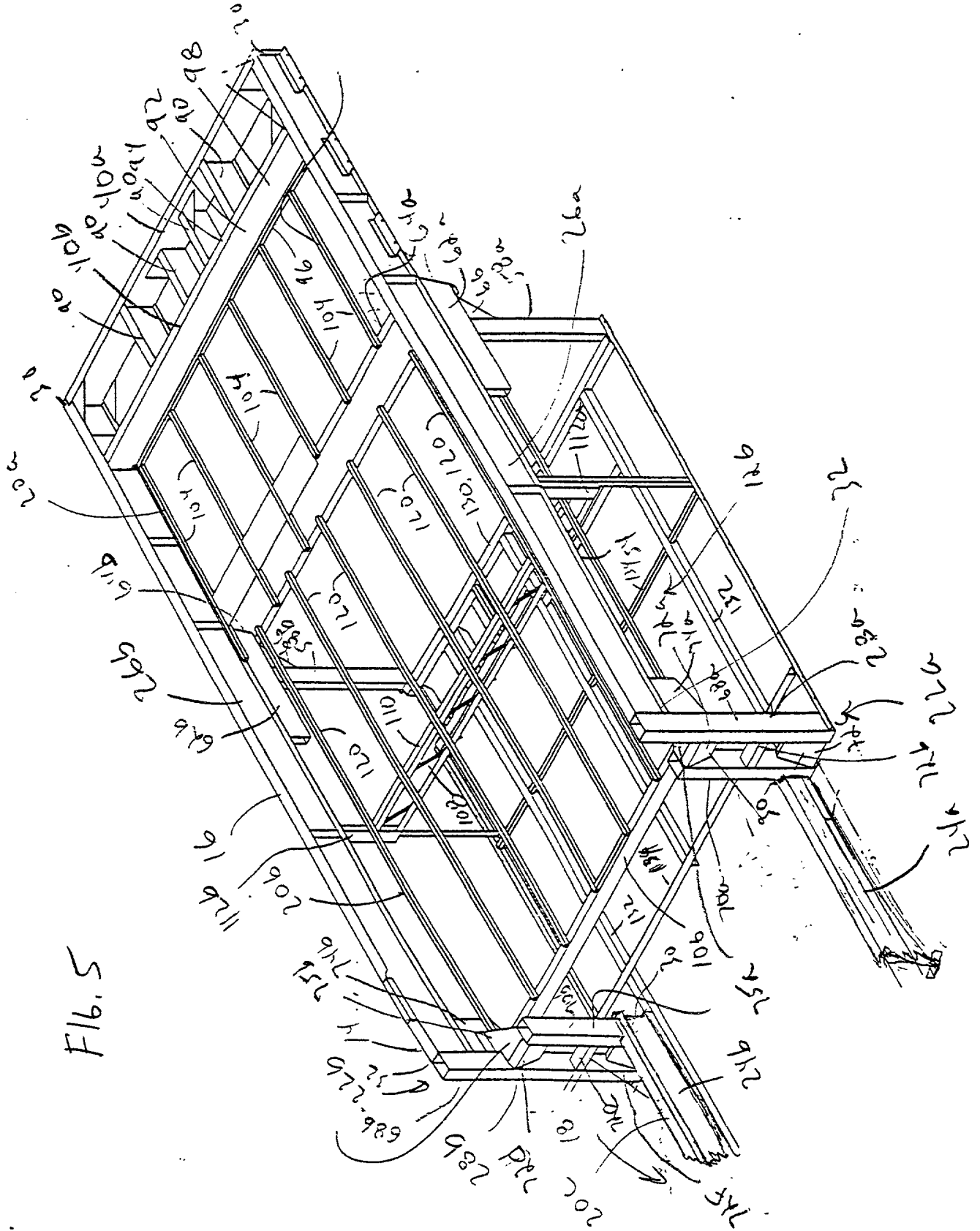
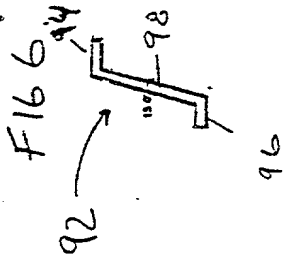




Fig. 3







[illegible]

<b>DECLARATION FOR UTILITY PATENT APPLICATION</b>	Attorney Docket Number	1244-003
	First Named Inventor	Anthony G. Ingram et al.
	<b>COMPLETE IF KNOWN</b>	
	Application Number	
	Filing Date	August 1, 2000
	Group Art Unit	
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	Examiner's Name	
<input type="checkbox"/> Declaration Submitted after Initial Filing		

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**TRAVEL TRAILER**

the specification of which

☒ is attached hereto; OR

☐ was filed on \_\_\_\_\_ as U.S. Application Number \_\_\_\_\_, and was amended on \_\_\_\_\_

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code § 119 (a) - (d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application Numbers	Country	Foreign Filing Date	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

Application Number(s)	Filing Date	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority sheet attached hereto.

### DECLARATION - Utility Patent Application

As a named inventor, I hereby appoint the following registered practitioners to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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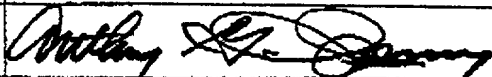
I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

First or Sole Inventor

☐ A petition has been filed for this unsigned inventor.

Inventor's Name Anthony G. Ingram

Inventor's Signature



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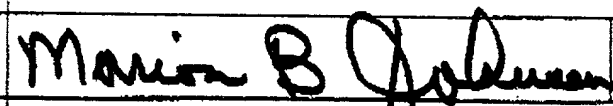
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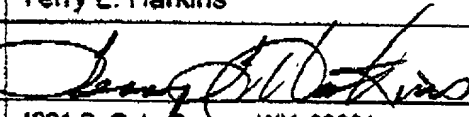
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